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Essence controls in pharmaceutical enterprise systems

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Abstract

The healthcare access is fundamental rights for every human being. It is Government's responsibility to provide authentic Medicines and good healthcare system to its people as essential part of human life. Currently many governments across the countries are coming up with many welfare schemes to provide good healthcare services as a fundamental right. Pharmaceutical industry is also considered an essential part of healthcare services as it continuously invents new drugs to improve people's life.

New research and their potential outcomes raising new hopes of curing critical and rare diseases. Pharmaceutical industry must adopt innovative technologies in enterprise systems which help to control the process of medicine invention from research stage to final drug approval. Enterprise system secure the research information and patients confidential data, maintain Good manufacturing Practice (GMP) in production to manufacture breakthrough medicine for improving human life expectancy and quality of life. Enterprise system also provide accurate information's for internal and external audit. Enterprise system in pharmaceutical business process effectively reduce defects and Corrective and Preventive Actions (CAPA). New drug development and alternatives of expensive medicines are offering cost effective and affordable treatment plans to poor population. However, adopting new technologies in enterprise systems and improving existing infrastructure is another key challenge for poor and developing countries [1]. The complex and lengthy process of drug launch and huge investment on research and development make process more vulnerable when results are discovered without any prominent health improvements [2]. Newly launch drugs are trend to be costly and unaffordable for poor patients who need them and put a high pressure on health care budgets. These trends raise questions about incentives at work in the pharmaceutical sector and the sustainability of current pricing models.

Keywords: Key controls of Pharmaceuticals; Enterprise Systems; Regulatory compliance; Pharmaceutical Barcode; Pharmaceutical Serialization; Drug price controls; Master Data Governance

1. Introduction

Pharmaceutical processes are highly regulated and follows stringent compliance. The drug development life cycle has to go through many regulatory scrutinizes mandated reporting across all pharmaceutical operations include research and development (R&D), Sales and Marketing, fair price policies, confidentiality and security of patient health information. Reporting adverse events during clinical trials, following good manufacturing process (GMP) and creating Standard operation procedures (SOP) for new business process adaptation. These strict regulated policies and regressive audit ensure good healthcare services and drugs are provided to patients. Due to the risk of non-compliance and other threats to the pharmaceutical industry, drug developers should thoroughly understand what regulatory bodies govern them, be aware of new guidance and how it applies to them, and prioritize regulatory compliance at an enterprise system level. There were many historical adverse events that have drawn urgent focus of government on medical affairs. The governments are making policy change for providing affordable services and

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drugs. Another factor is rapid globalization of healthcare industries and easy accessibility of drugs due to improved digital supply chain. Some organizations are focusing on expending their medical affair services and through improved processes. The arrange more trainings, adopt quality improvement technologies and equipment's. Most of adverse events can be minimize by adopting enterprise systems as they are capable of making process automatic without human intervention wherever required.

2. Pharmaceutical Compliances

Pharmaceutical is highly monitored and regulated industry as it is directly impacting to human life. Pharmaceutical industry needs to follow regressive rules and challenging task to comply with many regulations across the all-business scenarios. Recent pandemic increased the challenges and complexity of business model due to stringent policies.

Pharmaceutical industry tends not to challenge the regulatory environment as challenging compliance may deeply affect process, goodwill, cost and lead them to become non-compliance. Furthermore, any warning letter or critical observations from regulatory agency may jeopardize their business in pharmaceutical market. The complex environment and extraordinary challenge of maintaining pharmaceutical compliance in digital supply chain has pressured organizations to stricken their internal and external policies and force them to adopt innovative enterprise systems and niche technologies. These challenges drive pharmaceutical industries to evaluate their approach towards current issues and find better compliance resolutions by implementing enterprise systems in their business environment. One prospective solution is to form compliance steering committee who will monitor and discuss the key issues with stakeholders. This will ensure that compliance activities are prioritized as potential improvement with development of scrutinized and risk-free environment. There are several pharmaceutical laws which controls concern of manufacturing, selling, distributing and price control of pharmaceutical drugs. These laws protect the brand ownership, intellectual property rights, goodwill and patents of companies' pharmaceutical research and discoveries. Business enterprise systems is critical for successful executions of process under regulatory compliance. They monitor individual task and ensure process executed as per defined Standard operating procedures (SOP)

2.1. Information Management in Quality Control

According to the FDA, "The pharmaceutical quality control laboratory serves one of the most important functions in pharmaceutical production and control. A significant portion of the CGMP regulations (21 CFR211) pertain to the quality control laboratory and product testing. The QC laboratory is therefore central to pharmaceutical manufacturing. The testing it conducts confirms product quality and the reports it generates provide the documentary evidence. Enormous amounts of data are generated as the result of testing at various stages of manufacturing, and these should reveal whether quality has been sustained throughout the process. Unsurprisingly, QC laboratory data is the subject of intense regulatory scrutiny since any errors might result in the manufacture of products that may be ineffective or threaten patient safety. Such data may also be indicative of the transparency of a company's systems.

The integrity (completeness, consistency and accuracy) of QC data is critical. It should be attributable, legible, contemporaneously recorded, original or a true copy, and accurate, as well as complete, consistent, enduring and available. Laboratory functions are often managed using a variety of business enterprise systems tools. These business enterprise systems can include Lab Execution Systems (LES) that drive laboratory procedures, and Scientific Data Management Systems (SDMS) to integrate instruments across the facility and centralize data capture. Many LIMS will operate alongside these to enable organizations to see how their lab is operating and identify any data trending towards warning or failure. However, there is growing demand for a more unified approach to laboratory and data management. To meet current needs, business enterprise system provides a comprehensive solution with complete informatics infrastructure that brings together LIMS, SDMS and LES. Having all these capabilities within a single business enterprise system simplifies training and administration, streamlines compliance, offers better overall quality control, and can be executed across different geographies and partnerships for more holistic management.

2.2. Pharmaceuticals - Noncompliance

Pharmaceutical's non-compliance is critical issue and can have devastating impact on its manufacturing and other business process. Pharma manufacturing processes and supply chains are highly complex. Companies, both large and small, are often partly or even completely dependent on their outsourced manufacturing partners. These mutual dependencies mean that any suspension of manufacture at a contract manufacturing site or supplier will affect their productions and can result in substantial financial business interruption losses. In the past, physical damage has been seen as the key business interruption risk, but regulatory-based risks are often more critical. Achieving growth and resilience by acquiring business enterprise system is a key part of the strategic model in the pharmaceutical industry. Any major manufacturing irregularity in GMP is likely to lead to regulatory actions such as a 483, Warning Letter and

consent decree in the US; the withdrawal of manufacturing authorisation in Europe; or an import ban. All will lead to major interruptions in production while remediation takes place to bring the facility back into compliance. Loss of manufacturing capability as a result of regulatory non-compliance can have a devastating impact on biopharma or medical device manufacturers and can happen anywhere along a company's supply chain. Implementing business enterprise system will in GMP area like production floor and QA/QC area ensure defect free environment.

3. New Drugs Approval Process

In the U.S. Food and Drug Administration (FDA) issued a Compliance Policy Guide (CPG) titled “Marketed Unapproved Drugs,”¹ On September 19, 2011, which revises the FDA's 2006 CPG regarding the same topic. The CPG not only sets forth the FDA's current view on enforcement action related to these drugs, but also explain how manufacturers can voluntarily file a New Drug Application (NDA). The CPG established several categories of marketed unapproved drugs that the FDA views as enforcement priorities. Consistent with the FDA's goal of ensuring that all products comply with the approval provisions of the Federal Food, Drug, and Cosmetic Act (FDCA)—namely that all drug products demonstrate both safety and effectiveness—the FDA stated that priority products will be

- drugs with potential safety risks;
- drugs that lack evidence of effectiveness;
- “Health Fraud Drugs,” meaning drugs that have not been proven safe and effective for their promoted benefits;
- drugs that otherwise challenge the NDA or over-the-counter (OTC) review systems;
- drugs that otherwise violate the FDCA; and
- drugs that have been reformulated to avoid FDA action, but that remain noncompliant.

With this context FDA indicated that it will evaluate products on a case-by case basis to determine whether some period of continued marketing is warranted. Thus, a “grace period” may exist, depending upon: the effects on the public; the difficulty of performing the necessary scientific studies on the product; the relative burden on the affected parties; the FDA's resources; and other special circumstances. The CPG further provides for a special circumstance where the variable grace period described above can result in a de facto exclusivity period for the manufacturer who first complies with the FDCA.

The FDA recognizes that a company may file an NDA for a product that other companies are marketing without approval. For such drugs, the FDA has indicated that it normally intends to allow for a one-year grace period before initiating any enforcement action against unapproved drugs that remain on the market. However, this one-year period is variable and will be decided on a case-by-case basis. If the grace period is shorter, according to the CPG, “the more likely it is that the first company to obtain approval will have a period of de facto market exclusivity before other products obtain approval [4].

Pharmaceutical companies can leverage the opportunity to invest in enterprise system to identify and divest some non-strategic assets to an interested buyer who would then continue to supply the seller with the finished products. It will help small manufacture to overcome with budget constrain and arrange funds to invest in enterprise system to minimize the risk of defects [5].

In order to minimize risks, the seller wanted the buyer to provide evidence that they could finance the potential loss and replacement of the supplied products in the event of manufacturing errors, which could potentially lead to product wastage and product shortage.

4. Quality Audit

A pharmaceutical quality audit is a mandatory systematic and independent analysis of data and task which establish whether the activities perform are compliant with standard regulations. It will also determine whether they are effectively implemented to achieve the required objectives. Quality audits, whether internal or external, are essential to a good pharmaceutical quality management system. With the help of quality audits, pharmaceutical company will effectively evaluate compliance with regulatory requirements and get the required feedback, which is needed for improvement.

4.1. Internal Auditing

Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations [6]. According to regional legislations, the internal audit is defined for EU members as "self-inspection" [7] and as "measurement, analysis and improvement" according to ISO 9000:2000 [8]. The process of internal audit is carried out by a distributor on its own systems, procedures and facilities [9]. The distributor employs the internal auditor. The Sarbanes-Oxley Act (SOX) is also critical compliance as per US federal law. It increases transparency in financial reporting and formalized enterprise systems for internal controls. Pharmaceutical companies use SOX control through enterprise system any financial data breach and revenue leakage [10]. 21CFR part 11 is another regulatory compliance that establishes the United States Food and Drug Administration regulations on electronic records and electronic signatures. Business enterprise systems are capable of storing all audit logs and authenticate transactions through electronic signatures.

As a pharmaceutical company, you will audit your facilities, systems, and standard operating procedures (SOPs) under a process called internal auditing. These audits are conducted regularly, and you must have procedures and programs available for conducting such audits.

Depending on the complexity of the internal auditing process, it can be categorized into multiple categories:

Tier 1 - These audits are the least complex of the internal audits. They are conducted by personnel of the concerned department or section.

These audits are normally of short duration, are frequent, and concentrate on issues such as auditing the housekeeping or documentation of a particular department or section.

Tier 2 - These types of internal audits are more complex when compared to tier 1 internal audits. They focus more on the system and the frequency is less when compared to tier 1 audits. These audits, by their nature, will be of longer duration, and the auditors need to have rigorous training with an emphasis on the quality systems and techniques. Also, the auditors will be personnel independent of the concerned department or section.

Tier 3 - Tier 3 internal audits are the most complex and least frequent of the internal audits. They can be carried out to assess the readiness of the pharmaceutical company for a forthcoming regulatory audit. Additionally, tier 3 internal audits may be conducted before beginning a crucial activity within the company.

The auditors for tier 3 internal audits need to be highly trained with the necessary expertise and knowledge of all regulatory requirements in the pharmaceutical industry

4.2. External Auditing

Pharmaceutical companies routinely require external audits to ensure operations are in accordance with established guidelines. A financial audit will review the accuracy of the company's financial statements by evaluating fiscal solvency with regard to assets and liabilities. A compliance audit will assess level of conformance with operating procedures as stipulated by contractual arrangements and/or government regulatory agencies, including an investigation of hard-copy prescriptions, computerized records of refills and invoice records. An operational audit, also called a performance or management audit, seeks to evaluate the company's overall efficiency as a vendor administering prescription plans for various sponsors. Commence with an opening meeting to introduce auditors to the company's management, explain the audit rationale, review scope and objectives, and agree on the agenda and timeline. Clarify any confidentiality issues such as safety, taking photographs and samples. Observe, question, examine documentation and records, and challenge issues of concern to obtain evidence of compliance. For a compliance audit, test the drugs the company produces to ensure they contain the specific medication required by law. Examine expenses, especially research and development costs toward new drugs. Test the integrity and adequacy of internal controls that limit or prohibit inappropriate actions by company employees. Record observations and discuss any concerns with the auditee. [11]. External audit also monitors sales data and control distribution of medicine through legal supply chain. It can mitigate the risk of potential counterfeiting of drugs through illicit and black market [12].

5. Pharmaceutical Supply chain

Pharmaceutical supply chain is critical and integral part of pharmaceutical business process. Any adverse event occurred in the pharmaceutical supply chain, not only affects the drug potency and shelf life due to delay but also can threaten the patients' life by hindering access to medicines due to shortage [13]. Implementing Digital traceability of pharmaceutical drugs in supply chain has been proving a very impactful process to minimize the risk of counterfeit

and illicit drugs in the market [14] [15]. Additionally implementing blockchain can be used for resilient end-to-end digital tracking systems through the supply chain [16]. Encoding correct GS1 barcode in pharmaceutical packages also regulatory compliance as per Healthcare Distribution Alliance (HDA) which determine the information accuracy across the supply chain [17]. Currently FDA is conducting Some pilot projects to assess blockchain technologies if they can completely mitigate the risk of counterfeit or illicit drugs from the supply chain [18]. Under the pilot project, Drug Supply Chain Security Act (DSCSA) determining if blockchain technology can be utilize for saleable return in interoperable network [19].

6. Conclusion

Pharmaceutical industry have very discipline and regulated business processes. Adopting enterprise system in pharmaceutical Industry is the best way to recognize and track every single raw material from receipt through processing, bundling, and shipping, to the specific client location. In the pharmaceutical industry, medical device, and biotech sectors, product quality issues can (quite literally) mean the difference between life and death. Organizations operate in one of the world's most highly regulated sectors with mandates impacting R&D, product development, traceability, quality management, and reporting. Organizations are challenged to not only be at the forefront of innovation, but to follow closely controlled processes to develop and manufacture products that meet the strictest quality standards. To compete and thrive in this environment, pharmaceutical industry need to thoroughly evaluate and understand enterprise systems that monitor production, purchasing, documentation and traceability — while cost-effectively managing compliance requirements.

Compliance with ethical standards

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